

AVIATION

The Oldest American Aeronautical Magazine

FEBRUARY 9, 1929

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XXVJ

NUMBER
6

Special Features

Give Service Plus to the Air Traveler
Control System Care and Maintenance
Aviation Insurance in the United States

AVIATION PUBLISHING CORPORATION
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LONG ISLAND CITY
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ROOSEVELT FIELD FLYING SCHOOL, INC.

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THANK YOU for receiving AVIATION

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Scene at the start of the Transcontinental Air Tour of 1928 at Roosevelt Field, Long Island, the third largest airfield in the U. S., and the location of the Roosevelt Field Flying School.

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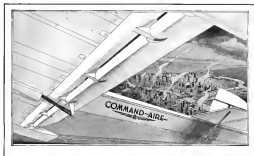
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Q "A properly made oxy-acetylene welded joint is as strong as the base metal, fully 100% efficient . . ."

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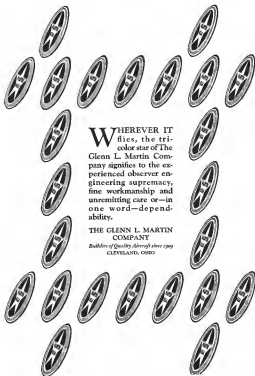


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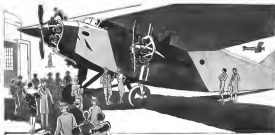


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The first name in flying

The WRIGHT
WHIRLWIND
J-3
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ENGINE



The Oldest American Aeronautical Magazine

Vol. XXVI

FEBRUARY 9, 1929

No. 6

Airports and Politics

WHILE the development now taking place in the matter of airports is most encouraging, every now and then one hears the sour note of politics and the news that some important municipal development has utterly suffered as a result. It is a foregone conclusion that anything connected with municipal government must run a political gauntlet, but at a time, such as the present, when the building and maintaining of an airport is of such vital import to business and humanity, it is little less than a crime for "the powers that be" to allow design and construction matters to be foisted around promiscuously, and to no definite end.

Of late a certain well-known and thoroughly streamlined city employed the services of a high salaried one of those airport experts, and when the expert had completed his survey and had submitted his plans they were immediately rejected and the task assigned to someone else, for reasons reported to be "political." The same procedure was followed in the design of the airport and equipment, as well as for the construction work. And the final outcome of all of this money has been radically expended, precisely nothing definite has been accomplished, and the city in question is still without a municipal airport, and will probably continue to be without it for some time to come.

There is, of course, no reason why the "city fathers" should not be most painstaking and deliberate in the selection of their airport and of the men to do the work.

But when the "council" has made a decision and authorized the expenditure of money, that action should be carried to terms. To continue to foist the "job" around to be no more evidence of good faith to the people of that section. It causes a delay in progress, which is injurious to the business and industry of that locality, and it certainly does not contribute one single thing to the betterment of aeronautics as a whole.

Introducing the N.S.P.A.

WHAT might be considered as an indication of progress in the solution of the ever present problem of stressing airplanes and engines, is to be found in the creation of the National Standard Parts Association. This association, which is composed of manufacturers and jobbers of standard automotive parts and for years has been most active in the task of distribution and retail sale of genuine parts, has at last applied an aeronautical conservative with a view toward establishing its members in the aeronautics field.

At first glance, such a move might not be regarded as one of benefit to the industry. And there are those

who may claim that the replacement parts business should be handled within the industry itself. Undoubtedly that is correct, but the main objective of every far thinking manufacturer is that of satisfying the needs and the demands of the customer. At the present time there are few, if any, manufacturers who have so established their sales and service organizations that the plane owner can obtain prompt and expert service no matter where he may "set down." It therefore follows that the entry into the field of an already established and well experienced organization is a step forward which cannot help but be of ultimate value to the manufacturer.

For years the automotive industry totally disregarded the importance of broadcasting the value of genuine parts, and for a time the so-called "gyp" reaped a rapid harvest. Finally, the automotive industry took up the "genuine parts" cry, and has been emphasizing it ever since. To avoid a similar circumstance in the aeronautics industry should be the desire of every engine and plane manufacturer, big or small, for, if history repeats, airplane sales volume will suffer as the result of poor service in replacement parts.

In the distribution of genuine aeronautics parts the National Standard Parts Association should be of tremendous help, and, as a matter of fact some of its members have been connected with the aeronautics industry for a long time. It is altogether logical that the Association will endeavor to increase through the medium of aeronautics jobbers, and, if that becomes responsible, it will distribute through its own outlets. The first action would seem to be the best, but service to the customer is paramount.

Painted Propellers

IN order that the sham-wooded and unwhipped individuals visiting an airport or flying field may be prevented from being injured by whirling propellers, airport managers are now taking steps to reduce their liability, or at least erect some sort of barrier about the planes. Such public safety precautions are highly worth while, regardless of expense, and should be encouraged at all times.

As an additional precaution to take care of the "stray" who may get past the barrier, several field managers have adopted the ingenious practice of painting the propeller blades with brilliant lures. The managers report that the results are very satisfactory in that the "birds of role" catch the eye at once and flash the warning. Of course care must be taken in "painting up" blades to make sure that perfect balance is not destroyed, and that the surface is protected from all kinds of weather conditions. However, if the "painting" idea becomes popular, as it probably will, perhaps propeller manufacturers will begin to produce blades "painted to taste."

Give Service Plus to the Air Traveler

By RALPH DUGGINS

Traffic Development Manager, Madsen Airlines, Inc.

EXTENSION of airlines depends primarily upon two factors: public patronage and addition of night flying facilities. Night flying possibilities depend entirely on lighting and radio intercom which today show rapid progress. The matter of extending these night devices is a separate problem of government co-operation and company financing.

The necessity of public patronage is manifest. Economically, however, the cost is ahead of the benefit. The public must patronize airlines at present prices heavily before the law of demand causes cheaper planes through increasing quality production. Many excellent engines and planes are produced with few repairs for quality, and yet in such small quantities that the price cannot be lowered materially. If present prices for passenger accommodations seem high the public must realize that they really are lower than cost makes logical, judging by the margin of profit in other industries.

I am convinced that the public is adding safety in flying. Considering that, it becomes a more simple problem in salesmanship to get them into the air.

Guessing the fact that people believe flying is safe, it becomes necessary to maintain not only the necessary equipment, but to add to air travel those conveniences and details of service which will bring the air traveler back again and again to utilize interurban and interstate planes. Air transport companies can so arrange their ground facilities that the casually curious will want—and reason to be converted into air-minded enthusiasts.

Madsen Airlines, Inc., is convinced of the truth of

the above statements. Granting their truth, what are we doing to meet sound public patronage? Unfortunately, we have made but few. There are no precedents to be followed unless we turn to the bus lines and railroads. Our pilots conferred and agreed that some such scheme is necessary, not because they and the ground crew have been deficient, but because a general re-alignment seemed necessary.

Inside an actual operation of the planes while in the air is continued, we have taken one important step and are preparing for a second. Recently all Madsen pilots were outfitted in uniforms. This has not distracted them, but has added to their dignity. The pilots are not policemen or guards. Their uniforms serve to distinguish them from hangmen and to give them an air of authority.

There have been occasions in the past when people on the ground would resent advice from a pilot, whom they could not distinguish from any other individual. Now when a uniformed pilot warns a bystander of the danger of a turning propeller, the bystander accepts the advice as coming from an authority. Our chief pilot, Larry Fritz, has been designated "commander" of the group, while the pilot of each plane is known as "captain." No longer do we speak of pilot sounds, but as captain so-

Passenger arriving and preparing to board a Madsen air liner.



How Madsen Airlines, Inc., Has Been Able to Build Up Repeat Business on All Four Divisions of Its System



Larry Fritz, commander of Madsen Airlines, Inc. Few individuals are better qualified to advise on matters relating to aviation.

and-on. The main in each plane is the constant pilot.

As a second step we plan to install loud-speaking units in the planes. The plane captain or the assistant pilot will be able to talk to the speaking apparatus in the pilot's cabin, keep the passengers advised of progress of land marks or any interesting points on the ground. In the past our passengers have been provided with maps and they have attempted, as on other lines, to pick out scenery by fly over it. This is difficult for the occasional air traveler to do. It is frequently confined to its direction and location. The vocal method should not only add interest in their trip but also will enable them to remember details. These changes indicate what can be done for passengers once they are in the air. These measures, however, the highly important problem of getting potential customers to visit the airport or the depot from which planes of the line depart and where they land. Even after this article appears in AVIATION, Madsen Airlines, Inc., will cover its headquarters to the Grand Central Air Terminal between Los Angeles and Glendale. As rapidly as possible after that move the company will establish a restaurant, a radio broadcasting station, and make other steps it deems advisable to draw crowds constantly to the air depot.

The terminal is only 30 minutes distance from 7th and Broadway, Los Angeles. Yet even in the light of the public's general interest in aviation, people will not draw that distance unless added conveniences are ready. This terminal will be opened officially February 17. At that time there will have been completed for Madsen Airlines, Inc., a concrete runway 150 ft wide and 2,500 ft long for taxiing purposes and a second runway 75 ft wide by 2,500 ft long. A second half-mile runway will later be completed.

Such facilities as these, including shops, are necessary to get ground. In addition to them, however, we will attempt to give service and catering rivaling that of the best hotels. Safety will be taken for granted and one product—air transportation—will be sold on the basis of superior service.

Our development in date has progressed along these general lines. Unlike most other air transport companies we do not establish two terminal and fly solely between these points. It is an intermediate town looks good air planes stop to distribute and take on passengers. This no doubt accounts partly for our success in carrying two and one-half times the number of passengers transported by any other line in the United States. Our passenger list now totals 2,000 people each month.

Even with courteous service and excellent airplanes provided, the major problem of the air transport companies continues to be that of suitable airports. We could not carry 2,000 persons a month around California if our planes landed on hazy fields. These airports

must be closer to the cities and should be at least one mile square. I say "must" advisedly. Many cities will not have aviation service until they purchase good property probably at higher prices than those at which they can purchase fields today. But train connections are important.

These facilities will avoid the transport companies nothing, however, if they do not achieve a volume business. Increased volume reduces the amount of overhead to be charged off against each passenger space and thus permits improvements and expansion of service. A company such as ours must do a considerable volume. Our daily schedule of regular runs, ignoring no shortcuts or stopovers, is 1946 mi. Flying an average of all business, including service between Los Angeles, our headquarters, and Escondido, Santa Ana, California, 80 mi south of the border in Old Mexico, and extra planes between Los Angeles and San Diego on week-ends, daily mileage actually runs 2,500 maximum average.

Madsen Airlines, Inc., started its first daily service between Los Angeles and San Diego in October, 1932. From a beginning of one Ford single-engine airplane, we now have 15 Ford planes, two 5-place Lockheed Vega monoplanes and two Travel Air biplanes. The Travel Airs are not available for public use. Five of the Fords are powered with "Wasp" engines and carry 14 passengers each.

To date approximately 500,000 mi have been flown by our planes since Nov. 15, 1932, and 20,000 passengers carried. This does not include a large amount of flying prior to that date on a special day basis with "occasional" steady flying. The date shown is of the definite start of daily service every day between Los Angeles and San Diego—both ways—under the management of the re-

composed organization. The total number of passenger miles in the more impressive figure, however, because lines with small planes in the past have flown as many miles—but far less passenger-miles. It is roughly estimated that Modhox Airlines' planes have flown about 3,000,000 passenger-miles.

There are now four divisions of the Modhox system. One is from Los Angeles to Bakersfield, Fresno, Visalia, Oxnard and San Francisco. Divison Number Two is from Los Angeles to Long Beach, Santa Ana, San Diego and Agua Caliente; a most pleasant way of spending a week-end. Another carries the planes round trip each day, flying both directions around the triangle between Los Angeles, San Diego and the Imperial Valley. This flight may be made by passengers at 10¢ per air mile, which is about seven cents per ground mile.

The fourth division consists of intensely regular control of Reason Airways' physical assets at Fresno, with the prospect of "push over" service for any one of the San Joaquin valley, whereby a business man may fly from his city, off the regular run, to Fresno, and then board the regular daily plane. Two Travel-Air airplanes, a large modern biplane, often and upon equipment are included in the deal. A fifth extension of the line is that of service from Agua Caliente to Bakersfield, Fresno.

One of the great problems of commercial aviation—how to get airplanes in being solved gradually by the Modhox organization. Demand of the U. S. Navy and several large American corporations, besides the purchase of an line, is responsible for the Ford Motor Company being far behind in its deliveries of Ford tri-motored, all metal liners. These planes are of 12 and 14 passenger types, with luxurious cabins, wide windows and ample room to walk about. Repeated requests for smaller planes to take private parties of four people—while very frequently the number of people who want to travel

together on short weekend trips—led to the purchase of two Vega monoplanes, built by the Lockheed Aircraft Corp. of California.

To operate our line, four dispatchers have been in operation since the early days of the company; operating maintenance, tribo-passenger-flight, auditing and advertising. Nine pilots operate the modern around whose others will be added from time to time, Larry being the only one who has been in the business since the start of the pilot base. All these men were trained at the Ford plant or under Pratt, who was first pilot at the Ford plant several years. The experience of the individual pilots ranges from seven to seventeen years.

Planes are handled and dispatched much in the manner that trucks are handled. While our line has no radio operators at this time, we depend upon government weather reports transmitted by the Guggenheim radio stations. This service proves adequate and for the general good of aviation should be continued after its present experimental period. Such receiving sets are maintained on every airport along the route of our planes.

Despite all this necessary arrangements guaranteeing safety in airline travel, the psychological side of travel and methods operators can use to meet the public demand for interesting air trips must be emphasized. It happens that our lines traverse some of the most picturesque country in the world. We have noted that passengers go for their second or third air trip, lowering the safety of airlines under government supervision, are more interested in ports of call and scenic beauties than in any other consideration. They realize the growing network of lines through the United States offers a real interest between progressive businessmen. Economic and pleasure value combine to spend entire evenings, and we consider the latter of these to be fully as important as the former. It is for that reason that we are now serving comfort, service and protection of general interest.

AVIATION
February 9, 1929

AVIATION
February 9, 1929

Control System Care and Maintenance

By C. L. OPENSTEIN

AN airplane crashed recently because of the failure of an eye splice (wired in the end of a control cable to connect it to the rudder bar). Careful periodic examinations of the control system will prevent accidents, and perhaps deaths.

It is difficult to state what parts of an airplane are the most important, but it is certain that the control system is one of them. Time spent in its examination and care is well worth while, and will prevent serious difficulty.

The control cables should be kept coated with grease at all times to prevent corrosion. The individual cables forming the cable are of small diameter, and have their strength seriously affected by rust.

Control cables should be carefully guarded against fraying. There are several causes of fraying; the principal ones being sand, or grit, and sharp bends. It has been found that an opening in the bottom of the baggage allows sand and grit to enter and accumulate in fairly large quantities. This sand, or grit, depending on the control cables where the cables pass around sheaves or fair leads, will eventually break the strands of the cable, causing fraying, and ultimately failure. Control cables, passing through fair leads with too great a change in direction, are also subject to broken strands and fraying.

There are a number of places in service now, in which some of the control cables and adjacent control diagonal brace members of the fuselage near the tail, and in some new cases, against the leading edge of the stabilizer.

Wherever these conditions have been found, manufacturers have been requested to cover the structural members with new leads. In some instances, in which the new hole had not been installed, manufacturers disclosed the fact that the control cables had run through the walls of the structural members for some distance. Further rubbing may have resulted in failure of the structural members, fraying of the control cable, or possibly jamming of controls. It is well to examine the new hole provision occasionally in order to replace it at the proper time. For this purpose, all airplanes should be provided with inspection windows near the tail of the fuselage. They should be either cutback control openings or the top panels.

An examination of the adjustable stabilizer mechanisms and fittings should be made quite frequently. In the event that failure of these mechanisms occurs, a crash may result. Recently, a certain type of plane gave considerable trouble, because of failure of the fitting which joined the stabilizer to the adjustable mechanism. A lag, which limits the thickness of the plate to which it was welded, broke through the weld, moving the trouble. When the proper proportion for the thickness of the lag to the plate was used, a good weld resulted, and no

further trouble was experienced. Inspection of other planes, having the improper type of fitting, showed that one of the two fittings was broken in several instances. Luckily, the fit of this plate is so tight and arranged, that it prevented the leading edge of the stabilizer from folding up in flight, following failure.

Inspection windows likewise should be provided in the wings of a plane in order that the aileron controls may be examined where they pass over sheaves—in the case of



Interior view of an airplane factory showing fuselage in the course of construction.

cables, and at the bell cranks in the case of push and pull rods. Recently a case was found in a certain type airplane that the push and pull rods in the lower wings were rubbing against the drag wires, resulting in serious damage to the rods. There is also a case in which the baggage, holding the aileron control sheaves, were of such light gauge material, that they became distorted considerably after a little service. This distortion allowed the control wires to pull off of one edge of the sheaves, and eventually to become jammed. Proper inspection would have prevented this.

The control stick fastening should be examined frequently. Sometimes also, the control stick bearings in a certain plane were enclosed in a metal box, which was secured to the floor of the cockpit. In order to keep dirt and grit out of the bearings the whole box was enclosed in a leather bag. It so happened that the bolts, holding the two halves of the box together and to the floor, were not long enough to be tight, or to have lock washers. One day, a pilot, in executing a certain maneuver, suddenly found that he had pulled the control stick and part of the bearing box completely away from the floor. The man and the bolts, holding the box together and to the floor, had backed off. In this case, it appeared that removing the leather bag to examine the bolts was too much trouble, and so it was not done.



Passengers boarding two Modhox tri-motored Ford air liners.

Aviation Insurance in the United States

By FRANKLIN D. MYERS
National Air Transport, Inc.

WITH the tremendous interest being evidenced in the aviation industry, it is surprising how little the events those anxiously engaged in aviation know about aviation insurance.

"Is it possible to secure public liability and property damage insurance?" "In case of a crash are your plane and parts insured?" "If I ride in one of your planes am I insured by you and in my life insurance and life insurance?" These are just a few of the questions asked every week.

The simplest answers to any of these questions lead into a further discussion of the various types of aviation insurance, including not only the different kinds of policies which may be secured, but also the rates. In this article I shall attempt to explain in a general way all the different types of aviation insurance which may be secured, and the variations in rates.

In order to get a clear picture it is necessary to go back to the hectic days of 1919-1925 when aviation insurance was first being given serious consideration. During these days there were a great many "crash" firms carrying passengers in anything which would "take the air." Of course, some of the pilots were very good and had very good equipment, but the majority were mediocre pilots with very poor equipment.

Many of these pilots applied for insurance on their equipment and were willing to pay the rates which were quoted. While the volume of aviation insurance during this time was not heavy, the losses paid by the insurance companies were then offset by income from passengers. As a result, the American companies withdrew from this field and left it open for foreign companies who still continued to carry this business at very high rates.

In addition to their high rates all of the policies offered were known as a "definite loss," varying from \$10,000 to \$100,000. This meant that in case of loss the owner of the airplane would assume the loss up to the figure specified in the policy. Many of these defensible claims were extremely odd.

Passenger Protection Policies

Passenger insurance was practically unknown and it was almost impossible for pilots themselves to secure life insurance except by the payment of an excessive premium. Gradually even the life insurance was refused to pilots.

This condition continued until 1925, with the exception of life insurance for certain classifications of pilots, which will be discussed here.

In the spring of 1923 Congress passed what is known as the Kelly Bill, which authorized the Post Office Department to contract with private carriers for the transporting of air mail. Prior to this the Post Office De-

partment itself had been handling the air mail, furnishing its own equipment and personnel. In the Fall of 1923 the Post Office Department contracted with private carriers for the transporting of air mail between Chicago and Dallas, Chicago and St. Louis, New York and Boston, Salt Lake City and Los Angeles, and Salt Lake City and Phoenix, Wash. At this time the subject of insurance for airplanes, engines, etc., became very important. Certain brokers had been working with the American insurance companies to secure quotations on air, public liability and property damage insurance. After a great deal of discussion certain of the American insurance companies agreed to underwrite these risks, although the rates seemed too high. Naturally, after their losses immediately following the war they felt that if they took the risks they should secure a premium sufficient to compensate them for carrying the risk. None of the American companies were willing to write insurance covering accidental damage or crashes.

Other Types of Insurance

Other types of insurance which might be classed as aviation insurance are fire insurance on planes, fire insurance on hangars, passenger insurance and life insurance for pilots and other aeronautical operators.

Fire insurance on airplanes, engines and spare parts constitutes the largest individual coverage. The rates on this insurance may vary from three per cent. to six per cent. as a basis per cent. of the net value of the equipment covered. The reason for this variation in rates can best be explained by taking three distinct examples:

"A" desires to insure equipment on equipment valued at \$50,000.00. The equipment itself is in fair condition, but is housed in a wooden hangar located in an isolated spot. Small band fire extinguishers exist but no fire protection. He stores gasoline and oil in the hangar, makes a regular practice of painting his airplane and warning up his engine in the hangar. He also has a tendency to leave only waste and rubbish lying around. Likewise, he permits smoking in the hangar.

"B" desires to insure the same type of equipment in the same type of building as mentioned above. "B", however, does not store gasoline and oil in the hangar, does not permit smoking and keeps the hangar clean and free from oily waste and rubbish.

"C" desires to cover the same type of equipment as "A" and "B". "C" has a brick hangar with a wooden roof and concrete floor and is done to municipal fire protection. His other conditions are similar to those of "B".

The rate for fire insurance for "A" would undoubtedly be over ten per cent. whereas for "B" it might be one and one-half or five per cent., and "C" would enjoy the lowest

possible rate. This is self-evident, and is based on the type of hangar, storage of gasoline and oil, general housekeeping and location of the hangar with respect to municipal fire protective measures.

While a rate of seven per cent. may seem exorbitant for continuous damage under example "A", there are a number of points which should be borne in mind. Airplanes are highly inflammable due to the preparation which is used to stretch and waterproof the skin on the wings and fuselage. This preparation is commonly known as "dope", and is a semi-cellulose product. In addition to this possible hazard of fire, which is itself in very remote, we have a condition of possible fire from gasoline stored in the larger due to carelessness in smoking, leakage from an engine and spontaneous combustion due to oily waste and poor housekeeping. While "B" and "C" also have the airplane hazard, they do not have the other more hazardous conditions within their hangars.

These points should also be taken into consideration in placing the fire insurance rates which are applied to the hangars themselves. These rates are generally fixed by the Board of Fire Insurance Underwriters by taking into consideration every possible fire hazard which may exist. Buildings themselves are classified according to the type of construction and the various types of hazards for which they may be used. Hangars are generally classified in the same division as garages.

Starting with the maximum rate for the locality it is possible to reduce this rate by careful handling and storage of inflammable materials. For instance, if gasoline, oil and dope are stored outside of the hangar a certain reduction in the rate per \$100 will be allowed. Further reductions can be secured by not storing the engines in the hangars and by keeping the building itself clean and free from oily waste and rubbish. Even the location and type of building plan will have a direct bearing on the rate applying.

When planning to build new hangars it will be wise to consult the engineers employed by the Board of Fire Insurance Underwriters before construction work is actually started. These engineers, whose services are furnished gratis, will be glad to make recommendations regarding construction and floor plans which may materially reduce the premium rate on both hangar and contents. While it may not be feasible to follow all of their recommendations, many of them may be applied with very little additional cost in construction.

Not only the hangar but also the equipment and spare parts should be fully covered by insurance. Pilots should always be covered under separate policies. In some cases airplanes on a complete flying unit may be included in the same policy with the spare parts, but even

underwriters may prefer to cover the spare parts separately. The airplanes as a complete flying unit may be covered for fire and crash insurance under one policy and spare parts covered for fire under separate policy. In either case a complete inventory of spare parts should always be available and it is best to keep a permanent inventory of spare parts not only for use in case of loss but also for use in the event of a crash.

An inventory has a great deal of value in case of fire loss in giving the actual amount of the loss. As in the case with all other types of fire insurance the burden of the proof of loss is on the owner and he should be in position to verify accurate as possible the actual quantity of material shown in his inventory and likewise the precise coverage made. As a whole the underwriters will be found very fair in making settlements and where quantity and price are in dispute a policy of give and take will generally result in a fair settlement for both the owner and the underwriter.

Policy Wording to Be Watched

Where fire insurance only is carried there are a number of points which should be watched very carefully as the wording of the policy. Fire in the hangar would naturally be understood as being covered. There are two cases of fire in connection with crashes, one of which would be covered and one in which would not be covered. A plane might crash on fire in the air and a pilot in attempting to land the plane might crash it and the plane be totally destroyed by fire. The other case is where a plane might crash and the fire be the direct result of the crash. In the wording of the policy it should be clearly understood that fire in the air is covered and if it is desired to cover a fire resulting from a crash this should also be stated. If crash insurance is carried fire resulting from a crash is covered as it is part of the loss as a result of the crash and it applies in either one of the two cases mentioned above.

The rates for crash insurance have varied more than for any type of aviation insurance and range anywhere from 10 per cent. to 17 per cent. of the net value of the equipment. The rate for any one individual coverage seems to be based on the type of flying done by the operator. Aviation school and like enterprises undoubtedly carry the highest rates.

This type of insurance always carries a deductible clause varying in amounts from 5 per cent. to 10 per cent. for individual airplanes to a flat amount of deductible loss in case of a fleet of airplanes. In the words of the policy a crash is one in which the plane falls from the air to the ground. There are many other types of losses



Front quarter view of a direct "Wing" powered Pratt & Whitney F10, 12 passenger monoplane.

which can be considered as crashes, including what would commonly be known as collisions. Crash insurance actually covers any type of accidental damage to the airplane from practically any cause.

A few actual accidents will best illustrate the wide variation of coverage included under crash insurance.

(a) A pilot, on making a landing on a regular airport overbushes his field and runs into a ditch at the end of the runway. In doing so he breaks the landing gear and possibly the wing of his plane.

(b) Taking-off, a section of the landing gear may give way with the pilot. He may take the air without further damage and succeed in his destination. He will undoubtedly have an accident when he attempts to land. This accident will generally result in the plane rolling over on its back and on a general rule the damage will be a bent propeller, one or two wing damaged, a damaged landing gear and possibly a fuselage.

(c) In taking-off there may be some obstacle on the runway, such as an automobile which might not have been seen by the pilot when he started his take-off. Before he gets into the air and while still on the runway the wings of his plane may strike the automobile, tearing the plane to be wrecked. This case might also be construed as that a pilot might land and strike some obstacle of the same type and damage his plane.

(d) An engine may start running just as the plane reaches the end of the runway on the take-off. The pilot is too close to the end of the field to attempt to do anything but get into the air, or cut his engine and await developments which result in an accident in either case.

(e) A mechanic may climb up on an engine with no one in the cockpit and when the engine starts the fuselage may be so far apart that, on lifting time, it will start to "take-off," and before it is stopped may be partially wrecked.

While the above cases may seem somewhat far-fetched they are all actual accidents and are covered by crash insurance.

There are one or two cases mentioned, namely (c) and (e), which are only collisions. There can also be collisions in the air between airplanes, collision of an airplane while landing crashing into a larger or other obstacle

above the ground, and there may be a collision where automobiles, etc., run into airplanes standing on the ground. All of these items can be covered by crash insurance.

There are a number of different methods employed in the filing of claims for crash insurance losses. Under certain policies which are being written it is necessary to file a photograph of the accident from at least three different angles, report of pilots and weather reports, together with an estimate of the actual damage sustained. Under some policies it is necessary to have an inspector examine and appraise the damage before it can be received. Under other policies the owner has the right to have the airplane repaired and submit the cost of repairs, including both parts and labor, to the underwriter for settlement. In case of total losses it is only necessary to file for the total value of the equipment as shown in the policy.

Only Fair Pilot Position

Cases involving crash insurance nearly always involve workmen's compensation and in many cases public liability and property damage insurance. This is more especially true of workmen's compensation insurance than of public liability and property damage due to the fact that in nearly any case of accidental damage there is at least a pilot in the airplane who may involve certain legal claims. Some of these claims may seem to the reader as maintaining the danger of injury to a pilot. However, in a record of approximately 150 accidents involving crash insurance there were only five fatalities among pilots and previously no other claims for workmen's compensation.

In the few cases involving workmen's compensation the majority necessitated only an examination for possible injury.

Workmen's compensation insurance still seems to be the least understood type of insurance written. While it does have many complications it is really simple to operate and applications.

Nearly every State has a workmen's compensation law and the laws vary almost as much as the variations between day and night or summer and winter. These laws now cover the rates applicable to all classes of employ-

ment, the methods used in the filing and settlement of claims and the possibility of insuring with some established underwriter rather than with the State, etc. In certain States the law is so worded that all workmen's compensation must be carried with the Industrial Commission of that State and no insurance company is authorized to write that type of insurance within the State. The rates are applied against the payroll and are based on the type of work done by the employees. For instance,



A. Mace Albrecht Co "Mooseman"

in Illinois the rate for office employees ranged in 1937 from \$0.49 per hundred dollars of payroll. For mechanics \$2.24, and for pilots \$7.55. There is a period immediately following an accident, ranging from one to two weeks in most instances, during which the employee draws no compensation and after that period the amount of compensation is fixed by law as a percentage of the salary with a maximum limit which is permitted to pay if the disability occurs a period of over four weeks compensation is paid for the entire period of disability. Reasonable and necessary doctor's fees and hospital bills are permissible, payments in full.

There is a special form to be used in reporting accidents. These reports should be filed out as soon as possible after the accident and forwarded through the proper channels. In the case of aviation mechanics it has been found that most of the claims filed under workmen's compensation cover only a doctor's fee for one examination.

In case of death it is necessary to file a full report and after proof of death and proof of dependency has been established and final action taken by the State Industrial Commission payments are made on a weekly basis.

Before covering pilots under workmen's compensation it is well to investigate the laws of the various States in which the pilots are operating. Since pilots are insured it is best to cover them under the laws of the State which governs where they are in extra territorial rights. By this it is meant that a pilot based in the State of Illinois and flying from Chicago to Omaha might be insured under Illinois workmen's compensation laws, could be injured in Nebraska and would be able to collect compensation.

To show the other extreme a pilot based in Nebraska and flying from Omaha, Neb., to Los Angeles covered under the laws of Nebraska and injured in Arizona could not secure compensation in Nebraska inasmuch as it is necessary that a pilot be insured in the State of Illinois before he can collect. This is one of the main points to watch in placing workmen's compensation insurance.

While public liability and property damage insurance may both be involved under accidental damage most of the claims will be under property damage insurance. In the case noted under crash insurance where the pilot struck an automobile it is plainly seen the property damage would be involved.

Property damage insurance always covers injury to the

property of another, public liability covers injury to an individual. These two types of insurance are generally written under one policy. The rate for these two types of insurance is generally based on the number of miles flown and ranges from approximately 1¢ to 4¢ per mile.

There have been very few claims filed under public liability policies due to the fact that there are very few accidents involving injury to other than the operating personnel. One or two instances to illustrate public liability might be mentioned.

A rather noted personage in taking a business trip by air. The newspaper photographer, against the warnings of the employees of the company owning the plane, climbed upon the plane to get a photograph. After inspecting his photograph the employees offer to help him down from the plane, inasmuch as the engine is running. He refused the aid and jumped. In doing so he lost his head in the propeller. In this case the insurance company refused to pay the claim due to the negligence of the photographer. The negligence is due to his disregarding warnings to keep away from the plane and refusing to get going down from the plane.

A second case which might be cited is where an airplane lands on a field when the services of the employees are sub-contracted. In other words, the services of the employees are contracted through another employee. In attempting to crank the engine of the airplane the engine backfires and as a result the propeller strikes the employee breaking his arm and two other ribs. This case is really involved two types of insurance, public liability from the standpoint of the owner of the airplane and workmen's compensation from the subcontractor.

There are times when claims might be filed under both public liability and property damage. Such an instance is where a plane hits over a farm while a farmer is tending a team of horses to a plow. The horses become



Side view of an "Englewood"

frustrated by the plane, run away, and in doing so they injure the farmer and before they are finally stopped they injure themselves and the bull run away from the plane. The injury to the farmer would be settled under public liability and the injury to the horses and plow would be settled under property damage.

There are many different types of damage which are properly claim under property damage insurance. This type of loss has almost as many variations as accidental damage. The following are some interesting cases:

(a) A pilot making a forced landing attempted to land in a pasture in which a bull was grazing. When the pilot attempted to land the bull ran away from the plane. The plane had no sooner stopped when the bull turned and charged the plane injuring not only the plane but itself. The owner of the airplane was responsible for injuries sustained by the bull and would be compelled



A line-up of "Warp" powered Hinders biplane monoplane

to pay damages. This would be in addition to the cost of repairing his own plane.

(b) A pilot makes a forced landing in a soft field and while landing damages his own or such an extent that it is necessary to do considerable trucking over the field to get new parts and to remove the damaged parts. The field has been planted with wheat which is just coming out. The forced landing itself did no damage to the wheat but the trucks running back and forth over the field injured a fair portion of the expected crop. There is a definite claim for property damage, which, of course, must be estimated.

In most cases of property damage the loss is not due to the crashing of an airplane but is due usually to damage by people coming around the plane and trucking back and forth over the field or property. Numerous other cases might be cited which would bring this out more clearly but nearly everyone knows the basis on which property damage claims may be filed.

Most of the losses under property damage claims are very small and it may seem that for the small amount of the claims which are paid that this type of insurance need not be carried. However, in one of our cases the insured under either property damage or public liability the underwriter agrees to assume all court costs and defend the case for the insured. These expenses will sometimes pay for the insurance.

A number of methods of arriving at a premium rate for public liability and property damage insurance have been suggested. One method has been to base the rate on pilot salaries. Another bases the rate on valuation of equipment and still another bases the rate on percentage of day or night flying done. However, the rate based on the mileage is additively the fairest to both the underwriter and to the insured.

Where the operators carry passengers for hire, passenger insurance should be carried. There have been two or three methods suggested for writing this type of insurance. These methods are as follows: the coverage should be \$10,000 for any one individual, with \$100,000 maximum for any one accident. This coverage would be written on the number of passengers carried in the different types of planes. The rates which have been suggested are based on (a) per flying hour, (b) flat rate per passenger, (c) per mile hour. Of these three methods (a) and (c) are the most logical.

A Daily Passenger Policy

In addition to this insurance, which is carried by the operators themselves, there has recently come into existence a daily passenger insurance policy, written along the same lines as that now sold for rail travel. The annual rate on this insurance was \$1 per \$1,000, but this is now being reduced to where it was insurance may be secured for \$2 for \$3,000 insurance.

Most life insurance policies now carry a clause which permits flying as a passenger provided such flying is done in licensed airplanes with licensed pilots and such flights are regularly checked. In cases where life insurance policies have been of long standing, most companies will raise an endorsement permitting flying on the above basis. This also applies to some accident policies.

The only other types of insurance of direct interest to flight operators are automobile and household insurance on buildings and equipment. Automobile insurance and household insurance on buildings are written at standard rates. Tornado insurance on equipment may, as a general rule, be written at a very reasonable rate and in many instances of loss need hardly be considered.

Another question which is often asked is "Can pilots secure life insurance?"

For a time immediately following the war life insurance companies refused to write insurance on those engaged in piloting aircraft. When the Post Office Department started to fly mail this condition still existed, but in 1943 or 1934 and or two companies elected to write insurance on air mail pilots flying in Government service, at a "loading" of \$25 per \$1,000 over the regular premium on amounts up to \$10,000. They also wrote life insurance on Army, Navy and Marine Corps pilots on a "loading" of \$25 per \$1,000 over the regular premium. These were the only pilots which could be covered until approximately one year ago when one or two companies undertook to write life insurance on certain classes of pilots at a "loading" of \$12.50 per \$1,000. The pilots which these companies cover must be licensed pilots, flying licensed airplanes and over regularly checked routes. There are certain other qualifications which must be met before the policy will be issued. However, it is possible for practically all pilots employed by air mail operators to secure life insurance at this rate.

Group Rates Are Slightly Higher

Recently there has come into existence group life insurance covering all employees engaged in aviation, including pilots. The rate on this insurance will be slightly higher than it would be for other lines of business and, of course, the rate for so few insureds will be higher, although there may be one or two in the force.

As previously stated, many of the rates quoted here are high, and undoubtedly are high. It must be remembered that at the present time the aviation industry is considered as being in the pioneering stage and so much is considered hazardous. The underwriters lost money on their original aviation business and as a result have set their rates fairly high in order that they might be able to make a profit on this business.

The only method of reducing rates for the various types of insurance is by experience. If the experience is good and the underwriters pay no losses or small losses the rates will be reduced. If the losses are heavy the rates will stay high.

It is possible that the operators themselves can do much to reduce the rates than anyone else. This can be done by keeping the equipment in the best state condition at all times, by employing only the best pilots and in other ways to conform to practice.

The Federal Government is establishing many aids to flying which should also result in a direct savings to the operators and in helping eliminate losses. Weather reports are being furnished regularly, day and night, over a number of the lines and as far as possible will be furnished over all lines. Radio beacon equipment is being installed and a number of the operators are co-operating with the Government and installing both radio beacons and radio telephone equipment on their airplanes.

With the increased mileage which is being done from north to south and the many improvements which are being made in airplanes and engines it is logical to assume that insurance rates in general will be reduced as has been the case with railroad and automobile insurance.

Undoubtedly the underwriters will continue to base their rates for insurance on the type of equipment used, the type of pilots employed, methods used in flying and the amount in capital and other factors mentioned throughout this article. If the operators in return will keep the equipment up to standard and employ only first class pilots they will find the underwriters willing to meet them at least half way for better coverage.

By close cooperation between the operators and the underwriters it is hoped that rates on all aviation insurance may be materially reduced within the next few years.

The Personnel Problems in Aircraft Building

By WILLIS PARKER

THERE probably is no other line of manufacturing where careful workmanship is of such vital importance as in the building of planes. Where the product is as small and only a few are employed, it is quite possible to watch every manufacturing process and determine whether or not it is properly done. But where the company is on a large production basis and is employing hundreds of men, rapid responses are difficult. Some are certain that experience in the work to many workers assures better workmanship and increased safety in the completed product since the temperament and the mental and physical condition of one man is not reflected in a large degree in any portion of the work on the plane.

"How do you make certain that your men conform the maximum care in that part of the work assigned to them?" This was the question asked several plane manufacturers recently. The answers varied.

"Keep your men satisfied with the conditions under which they work," replied one. "This means adequate heating and ventilation, and frequent rest periods to permit them to smoke if they desire, thus not endangering

craft building is the coordination of several types of workmen. There is not just work, mental work and welding. If a man is a good welder, he can weld the framework of a fuselage after he has removed instructions regarding the strength of the weld and is furnished with a blue print of the frame to be welded. We find that we want pay better than the scale to get good welders—scale welders, should say. They must be satisfied. Unless they do their work right, a crash may occur, resulting in perhaps injury or death to the occupants of the plane.

"We can't look inside a weld, after it is done, so we do the welding of the metal. We have to depend upon the skill and craftsmanship of the man welding the torch. For that reason, we give the welders rest periods at stated intervals during the day. They need it and we have found they are better workers as a result. They do just as much if not more work in a day as they would and would were we to demand that they stick to their jobs from the time the whistle blows in the morning, until noon, and then from 1 o'clock until getting time."

The opportunity for advancement is the vision placed before the workers in another aircraft company. The president of this firm seeks to surround himself with men who are anxious to climb the ladder; men, who are interested in the future. This personnel program includes financial assistance for educational courses, an opportunity to assist in the business, stock benefits, etc. It is believed that such a program will increase the loyalty of his employees and that day loyalty will produce the best in workmanship. His is according to his endeavor.

Another manufacturer took a "hard-boiled" attitude. He declared that he succeeded in working with a good plane to work, that he was paying them good wages and, if they were not satisfied, they were at liberty to seek other positions. He has a system of rigid inspections and defects to rely too much upon the individual in the manufacture of his product.

Perhaps the most interesting method divulged was that of a manufacturer who learned that every member of the factory force take a flight in a plane from time to time.

"You men do not know when they will be summoned to the flying field to take a short hop. Neither do they know which one of the planes they have trained out will take them aloft. We believe that any workman who is acquainted with the fact that he will be expected to make a flight every once in a while and at irregular intervals will be participating in his work but he will be taken up in a plane on which he has been careless in his work. For his own personal safety he will make it the best possible work." We have determined no better method of insuring the best of workmanship that spells safety in construction.



The wing department of a modern airplane factory.

the buildings and the product by creating a fire hazard, which would be the case if they were permitted to smoke at their work. A man who is satisfied with his job, and the conditions under which he works, is likely to turn out his best work in order to keep his place on the staff. If he is not satisfied, he can and may skip up on some vital portion of the work that may not be determined until it is too late."

"We find that we get the best workmanship from men who have had an previous training in aircraft construction, but are men in the type of work to which they are accustomed," another manufacturer explained. "Air-

FOREIGN ACTIVITIES

England Has National Flying Services Plan

LONDON, ENGLAND—National Flying Services, Ltd., is the start of the company which plans to fly up all civilian flying within Great Britain, it was disclosed recently following much controversy since the two subsidiaries of the parent were organized.

Since having practically a monopoly on civilian flight outside of the realm of Imperial Airways, the scheme is to merge the support of a government-owned, £10,000,000 capital over a period of 30 years and based on the number of pilots trained.

The company will cost £50 for each pilot trained over during the first three years and £20 thereafter. The plan assumes the entire country through the establishment of 22 main airbases and 180 smaller ones. Civil hours will be built at the former.

Four airplanes, two intermediate and ground personnel will be stationed at each of the main fields. Flying costs will pay at a rate for the full cost of about \$25 each. Instruments is to cost \$10 as far as fuel and time flying \$1.50 an hour.

The company will concentrate on two types of planes for general work and one engine type, seeking for increased machine efficiency because the various pilots, too, young, pre-training and later, possibly, under one operation are not efficient.

Cosmos Accorded in Chile

The fact that this project separately is to improve the present situation of the high flying pilots for which the country has become famous has around considerable interest. It has been several times since the war that pilots have been doing general work with the wrong position they have held. It is at this point that they will be better off because the information that they will be absorbed by the same position.

Seeds Open Weekly Service

BAHIAQUILLA, COLOMBIA—Weekly service between here and Guayaquil, Ecuador, is being established which has been in operation by Aerolineas for some time. The company expects to tie up with the Peruvian Airlines system at Puyo, Northern Peru, soon.

Gets Pilot Rights in Japan

TOKYO, JAPAN—Extensive flight rights in Japan of the Hindley Page line, which has been acquired by the Mitsubishi Co., a large manufacturing concern.

Outline Route to India

LONDON, ENGLAND—The new air service to Karachi, India, due to open April 1, is to be made in the following stages: London-Rome, by plane; Rome-Bombay, by ship; Bombay-Canton, by plane; Canton-Bombay, by ship. The service by Imperial Airways will be the usual one in India and will reduce a dozen of long flights in a single service. The line will be extended to Calcutta and Madras presently.

Flights will leave London every Saturday at 9:40 A.M. and arrive at Karachi the next Friday at 8:30 A.M. Greenwich time. The flight time being 32 hr.

Two Boings Go to Canada

VANCOUVER, B. C.—The first of two new Boeing flying boats will join the fleet of the Western Canada Airways, Ltd., this month. The production will be used in different period, photo flights and mapping of timber lands, passenger carrying and being transported by the present in British Columbia.

Costs to Survey Airway

PARIS, FRANCE—Last December Costes is to start a survey flight over France from Paris, French Indo-China, over a route which is being considered for a permanent service in both this country and the colony. He will use a Breguet cabin plane fitted with a 600 hp. Hispano engine.

Canada Reports Air Mail

OTTAWA, CANADA—Canadian air mail planes carried 22,769 lb. of mail over the 12 regular routes and one special service route in 1958 to the end of the first week in December, it is reported.

Seven Ports of Entry Designated in Mexico

MEXICO CITY, MEXICO—The government has designated Monterrey, Tamaulipas, Toluca, Mexico, Guadalajara, Jalisco, Mazatlan and Tijuana as airports of entry along the United States border. Routes have been fixed for planes flying in this way from some of the border and military facilities away from these areas are facilities.

Plans are progressing for holding here in April the proposed 18 day anniversary for 175 airplane manufacturers are said to be interested in exhibits. Invitations to participate have been sent to many countries. An air meet will be held in connection with the exposition.

Pines Planting Plans Here

LONDON, ENGLAND—A system of planting pines along the route of the proposed service to India, due to be started this year, is expected planned by the Air Ministry. Each ditch would have a complete report about for work on the flying boats and each will be covered by 100 trees.

Mexico to Buy Seaplanes

MEXICO CITY, MEXICO—The government has decided to buy three of the latest and largest seaplanes for the Mexican Navy. Further purchases are expected in future years. The machines will be used for coastal patrol duty on the Mexican Gulf and Pacific coasts.

Carline Export Gets Contract

MONTREAL, CANADA—Carline-Bell Aircraft has contracted with the Carline Export Corp. to handle products of the firm located in Lake-Abasco, Mexico.

For New Distance Attempt



Japan's "Silver Tanager" also new fighter powered F4U Mustang in which an attempt at the world's longest flight record will be made in a single flight from Cape Town to Australia, England. The round-trip flight of F4U and Lockheed, Japan's first, now stands as the record.

THE BUYER'S LOG BOOK

Pyrene Fire Extinguisher

INCLUDED AMONG the pressure type fire extinguishers offered by the Pyrene Manufacturing Co., Newark, N. J., is the Model No. 3 special airplane type.

This extinguisher is operated by air pressure and is normally charged with air at a pressure of 100 lb., which is indicated by a gauge attached to the top of the extinguisher. It has been constructed to meet the rigid requirements of airplane service, reducing to a minimum the number of pressure light repairs.

This extinguisher, which is finished on nickel, consists mainly of four parts: an outer container of seamless drawn brass; an inner container made also of seamless drawn brass; a lead coating made up of brass to which the two shells are rigidly attached by screwing outer post brass end and soldered, and a straight line dual valve control mechanism made of brass which is operated by an aluminum hand wheel and lever. The lever is so attached that it can be easily detached or released.

The outer container holds the charges and equal of Pyrene fire extinguishing liquid, and the inner, the air pressure. These two containers are completely sealed and it is only by opening the dual control valve that a connection between the two is made. The operation of the extinguisher is effected by turning the control wheel lower down a quarter turn, this automatically permits the air in the pressure container to enter the liquid container and opens the discharge orifice so that the liquid is discharged under pressure.

The extinguisher is charged with air pressure through a standard air valve attached to the head cap and pressure can be raised by the use of an ordinary tire pump or air supplied from pressure tanks. The air gauge indicates the true pressure within the extinguisher and should be charged at 100 lb.

This extinguisher is furnished with a bracket of aluminum and can be installed permanently in any convenient location in the plane. The bracket permits of installation in either a vertical or a horizontal position and is so constructed that the extinguisher can be moved around its axis to suit local conditions. It may be installed for immediate or remote control by the pilot. In the latter case, a wire is usually attached to the operating lever and this control brought within reach of the pilot for use in case of fire. The extinguisher may be discharged fully or partially by the opening and closing of the control valve lever, as desired.

The discharge action may be connected with 3/16 in. standard copper tubing leading to fire extinguisher and under the control as that in case of fire, this action may be immediately flooded with fire extinguishing vapor.

An inspection glass is provided to ensure maintenance of the liquid level and the extinguisher can be refilled by removing the filler cap in the head casting.

Rotary Snow Plow

ONE OF the problems that the managers of the airports in the northern states will have to contend with is the quick removal of snow after a storm. Where several feet of snow accumulate on the landing space it has been necessary to plow runways, but the ordinary snow removal generally leaves high banks on either side of the cleared track.

In order to remedy this defect, the Rotary Snow Plow Co., Minneapolis, Minn., is manufacturing a new type of plow called the "Snow King." This plow, which has many in operation at the St. Paul Municipal Airport, is fastened to a tractor and the rotary blades, which cut into the drifts and force a series of snow through a chute and far to the side of the cleared path.



The "Snow King" rotary plow in operation at the St. Paul Municipal Airport.

are driven by a direct connection to the engine of the tractor.

By this system, not only are the runways freed of snow, close to the ground, but the banks are eliminated as it is possible to throw the snow as far as 40 ft. from the cleared path, thus widening the space required for the landing and take-off of planes.

Arens Control

TWO SIZES of Arens flexible controls for aircraft modifications have been placed on the market by the Wilson Steel Products Co., Chicago, Ill. This type of control is characterized by absence of back lash and affords positive push and pull around corners.

The 3/4 in. control which is designed for use with engine, brake, fuel and bomb releasing mechanism is constructed in a brass casting of 3/4 in. outside diameter. A 3/4 in. 28 thread is cut on each end of the sliding member. Connection is usually made by turning a 3/16 in. nut with the 3/4 in. 28 thread and screwing it to each end of the control. The radius of curvature at the bends is 1/4 in.

A standard size of 4/5 in. has been adapted for the 3/4 in. type which is intended for use in alternate stabilizer and elevator controls. Each ring of the casing, which is 9/16 in. in diameter, is 3/4 in. long. A 3/4 in. 28 thread is cut on each end. The radius of curvature is 3/4 in. Provision also has been made for Alcantara fabrication of these units.

Englehard P-2 Indicator

ACCURATE ENGINE temperatures may be obtained during trial tests with a portable indicator that is unaffected by vibration. The P-2 Indicator, developed by Charles Englehard, Inc., 90 Chestnut St., Newark, N. J., is not a new instrument, but one that has given no worth by more than 30 years satisfactory service in other applications.

It is simple, durable, reliable, can be easily and conveniently attached to any part of the engine, and it need not be held level.

The indicator works on the resistance-thermometer principle, and the readings are given direct in degrees Fahrenheit. Practically all other instruments giving direct readings, use jewels and delicately ground pivots, which become "worn in" from vibration, producing friction which results in erroneous readings.

Suspension of the thermometer in the Englehard indicator by rugged suspension elements prevents such difficulties and allows the thermometer lens to correspond to the most sensitive changes of electro motive force generated by thermocouples. As many as ten thermocouples can be connected with one indicator.

In determining maximum efficiency temperatures of an engine, or in correcting excessive engine temperatures the Englehard P-2 indicator is unique and valuable to testing agencies.

Champion "Aero Plugs"

THE AERO type spark plugs made by the Champion Spark Plug Co., Toledo, O., are so designed that the possibility of breaking them in such a way as to interfere with engine operation is very rare. Their ability to withstand tremendous pressures and temperatures is combined with the ability to withstand a large quantity of oil without fouling.

"Silencium" is used in the primary insulator and the preheating "dome" insulators, an exclusive feature of design in the Aero line. Its strength and ability to withstand heat and unusual electrical conditions not only insures protection against leakage at the terminal and but dependable operation under all conditions in the firing end.

Although the new Aero line is a departure from the standard design it still retains the standard features of the Champion four-piece construction, new gas tight copper gaskets and special analysis high compression electrodes which assure a fluid working. Exceptional care and fine workmanship are incorporated into the Champion line to render high performance in the requirements of aviation.

Among the Champion Aero type plugs are the Aero 9, a general purpose plug recommended for the Whittell J-3, Pratt & Whitney Wasp and Hornet. Kinner-Vicki M-3, Packard 25-1300 and J4-2500. Siemens Sifert, Sifert, Hallet, Irvia, Warner Scarab and Messers Salomon engines. The Aero 6 is specially designed for the Hispano Swia and other power plants requiring clearance for the spark plug hexagon and the Aero 1 is designed for exceptionally high compression engines.

SIDE SLIPS

By ROBERT R. OSBORN

Our attention is called by H. F. P. to a news item which states that an interesting analysis of Colonel Lindbergh's signature has been made by a Vermont graphologist and psychometrist.

"Col. Charles A. Lindbergh's signature is said to reveal a specimen of great determination, allowing nothing to defeat his basic intention by self-appointed goal," the story says. "Especially significant it is said, is his magnificent capital letter 'L' rooted below the line like some great oak immovably fixed in the soil. The signature also shows that he is a good natured and gentle, and the unusual height of the capital 'L' showing those other letters suggests goodness in the air."

We should think that any self-respecting graphologist would be ashamed to publish such a superficial and flimsy analysis. Didn't he notice the fact that the final "n" in his name is silent, indicating ability to fly from New York to Paris non-stop? And didn't he notice that only the central of the middle name is used which proves that the singer should be technical adviser of T. A. T.?

Some storywriters reader sends is a clipping from a Seattle paper, from which we quote the following: "Right-second thinking saved his life. He read the contents of his plane just as it crashed, bringing the crash out of his hands. Then he walked. The plane settled, and as it did so he came back on the track, poked and was in the field in water darkness in a perfect three-point landing."

This reminds us of the true Lady Astor, so that it was "saved her life by remarkable pressure of mind." Reading the article under that heading we discovered that she had found herself in the path of a horse running away and had stepped aside.

There was another time, too, when some American statesman did some "right-second thinking" and used "remarkable pressure of mind" in coming out of his home when it caught fire.

In a recent article by a prominent patent attorney, in which some of an attorney's experiences with inventions are described we find this:

"Another man came to me one time with a scheme for which he had recently already raised money. His idea was to do with weightlifting the construction of a foot by using an airplane in a rather novel fashion. He would go straight up in the air he said, and stay in one spot until the revolutions of the earth brought him where he felt like he had desired to land. He would then descend, acquire a load of freight and go again to wait until the earth revolved back to the point where his market was. Then he would go down and sell the freight. No, he was a crazy ether."

Possibly not, but the sanity of the people from whom he raised the money might well be investigated.

"AIRPLANE TIME TABLE OUT"—Headline. There's progress in an infant industry for you. Our timetables are apparently just as inaccurate as those of the railroads, even though we have just started.

"AIRPLANE ENGINE COMPANY EARNS THREE DOLLARS"—Headline.

Who remembers, not so very long ago, when this headline would have been taken literally?



Blueprints for the Standard Air Transport Company in Cleveland across airport and back by Austin

Austin is Ready to Make an Airport Survey and Report for You

AUSTIN is ready to help at a moment's notice! A telegram, a phone call or letter will bring an Austin Airport Engineer, who is prepared to make the selection of a site for your proposed airport.

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Site selection, Survey and Report, for a moderate fee, by Austin, nationally recognized Airport Engineers and Builders will enable you to obtain the most favorable consideration for the financing of your airport.

Whatever type or size of project you may be considering—complete airport, hangar, factors or other buildings—it will pay you to get in touch with Austin. Phone the nearest office, wire, or mail the Memo below.

THE AUSTIN COMPANY, Airport Engineers and Builders
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The Austin Company of California, 1244 Republic and San Francisco. The Austin Company of Texas, Dallas

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Memo to THE AUSTIN COMPANY, Cleveland—

We are interested in—

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For Hangar Interior Lighting



Type LCF16
For General Illumination



Ceiling Height Indicator



Wind Sock Faner



Type DCB24
For Lighting Landing Area



Type VE Vaporsol
Reflector Flood Lamp



Type MSA1
For Hangar Roof Lighting



Small Boundary Light
25 to 60-Watt Multiple



Type DCB14
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Complete information will be furnished upon request

"Everything in lighting equipment for Aircraft"



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THANK YOU for mentioning AVIATION

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Confidence

Soon the Ford trimotored, all-metal planes ordered for the transcontinental, airmail service will be operating.

They will be working on railroad schedules that ask no favors of the weather. They will be working in a service not tolerant of delays or cancellation for repairs and adjustments. They will be working in co-operation with rail services famed for their safety.

That they will justify their selection for this exacting work we are confident. This confidence is not based on hope, but on past performances.

During three years of operation on the Ford air routes from Detroit to Chicago, Cleveland and Buffalo a record of 96% on-time arrivals was established.

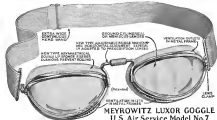
Not long ago a new Ford plane left the factory at Dearborn at two o'clock in the afternoon. It arrived at St. Paul that evening. The next morning it went into service on the run from St. Paul to Chicago. A round trip every day—about eight hours' flying. As this is written, two months later, it has yet to miss a trip!

These records of Ford planes indicate what the operator may expect of them. They merit your study when selecting equipment for any transport line you may be contemplating. And a product of these and similar records demands consideration—the other confidence in the Ford plane of the people whom you hope to carry as passengers.

Any information you may wish about the Ford trimotored, all-metal transport monoplane may be obtained by writing direct to us.

THE STOUT METAL AIRPLANE COMPANY
Division of Ford Motor Company
Dearborn, Michigan

THANK YOU for watching AVIATION



MEYROWITZ LUXOR GOGGLE
U.S. Air Service Model No. 7

\$13.75 complete with aluminum case



Protecting our pilots eyes

Meyrowitz Luxor Goggle, No. 7 U. S. Air Service Model illustrated above, represents the state of eye protection and comfort. This model is the culmination of years of research, optical experience and practical aviation experiments.

Beyond the fine materials and expert workmanship that are back with all Meyrowitz Luxor Goggles there are special patented features that have made our goggles the accepted standard for quality and performance. These exclusive features are covered by United States patents—

No. 1,433,486 No. 1,480,497 No. 1,480,329 No. 1,475,797

Unique venting system to disperse fog from lenses, defers all air from eyes from the nose and prevents the sweating or blurring of the lenses.

Continuous face binding and head band lock device, provides solid enhancement of lenses, prevents fogging, and provides for easy adjustment of the goggles to the face. The goggles are designed to fit the face of the pilot, and the face binding and head band lock device, provides for easy adjustment of the goggles to the face. The goggles are designed to fit the face of the pilot, and the face binding and head band lock device, provides for easy adjustment of the goggles to the face.

Some of these features have been imitated in other goggles on the market. Although imitations are made to be the nearest sort of failure, we urge you to buy the goggles you buy are GENUINE MEYROWITZ—made the same stamped on the frame. Only then, will you secure the quality, the performance and the full value of the exclusive features that have made Meyrowitz Luxor Goggles the most widely used in the world.

Chosen by the world's best aviators, used by the Army, Navy and Marine Corps Air Services, worn by the far famed forming the crew of the famous "Queen Mary".

Genuine Meyrowitz Luxor Goggles in a wide variety of types and for \$7.50 up.

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THANK YOU for watching AVIATION



ANNOUNCEMENT

Travel Air distributors for New York Metropolitan District

N. R. AIRWAYS, INC., who for the past year have been dealers in Travel Air planes, have secured the franchise for additional territory in the New York Metropolitan zone.

This organization is now in a position to handle sales and service on Travel Air planes of all types in the New York Metropolitan District, including Long Island City, Westchester County, Dutchess County, Columbia County, and Northern New Jersey, including Mercer County, Monmouth County.

Any type of Travel Air planes, open or cabin, may be purchased on our convenient deferred payment plan.

Arrangements can be made with the N. R. AIRWAYS, INC., for long distance passenger flights at reasonable rates.

N. R. Airways, Inc.
22 FRONT STREET, MINNEOLA, N. Y.



Represent:
**Roosevelt Field
Curtis Field**

Telephone:
Garden City 4672

TEARME YOU for aviation AVIATION

EAGLE ROCK

Re-enforces Its Strong Position in the Industry and Builds for the Future

EAGLE ROCK, with a background of success in the aircraft industry, was never stronger in its position than it is today.

Always a leader, the position of EAGLE ROCK has been strengthened materially, within the past year. New factory buildings were constructed and investment in aircraft development was doubled. Production was increased more than 50 per cent.

The schedule for this year calls for an additional investment of half a million dollars during the early months and a production increase to 1000 airplanes. To insure sufficient planes to satisfy the coming demands the firm of Stevenson, Harrison & Jordan, internationally known management engineers, has been engaged to survey production methods and bring them to the highest point of efficiency.

Col. Fred Cardway, noted expert specialist of New York City, has been appointed Vice Presi-

dent in Charge of International Affairs in the Alexander Aircraft Co. He will supervise extension of trade abroad.

Over and above these important developments is the fact that EAGLE ROCK is placing on the market a new type cabin plane. This addition to the present line will re-emphasize and re-enforce EAGLE ROCK as a leader in airplane style and improvements.

With the large production to be maintained this year and progress in design, EAGLE ROCK will give greater airplane value than ever before. As always, EAGLE ROCK will be able to meet all competition.

The reason for stating these facts to prospective EAGLE ROCK distributors and dealers is apparent. Any distributor or dealer with an eye to the future can look forward to a satisfying and voluminous. The word in the aircraft industry now is—watch EAGLE ROCK.



Dept. 10, Glendale, Indiana, Ind.

To J. A. McArthur, Vice President in Charge of Sales
I am interested in the position of an EAGLE ROCK
I am interested in the position of an EAGLE ROCK
I am interested in the position of an EAGLE ROCK

Name Address

TEARME YOU for aviation AVIATION

Savoia-Marchetti world famous flying boats and amphibians to be manufactured in America



THE American Aeronautical Corporation takes great pleasure in announcing its plans for the manufacture in the U.S.A. of the world famous Savoia-Marchetti flying boats and Amphibians.

These flying boats have made such remarkable showings in the past 10 years that we feel their achievements should be allowed to speak for themselves.

We give below a summary of the different records and performances made:

First crossing of the Alps in a seaplane: July, 1919, Schneider Cup. Won at Dourenco, in September, 1919, with seaplane S-13.

Schneider Cup: Won in Venice, in September, 1920, with seaplane S-12.

Flight: Sesto Calende-Stockholm-Bjaga-Reval-Stingfors-Aland Isles. Commander Maddalena broke the world's record for distance in seaplanes, with "Savoia" S-16.

World record for seaplane speed: 175.97 M.P.H., with seaplane S-31, December 24th, 1922.

Flight, Sesto Calende-India-Australia-Japan-Hong-Kong-South America-North America-Rome (50,000 miles), 1925, in seaplane S-16 with Commander de Pineda.

Flight of the Two Americas, in May-June, 1926, with seaplane S-39, by Messrs. Dugan and Olivero.

World records attained by our pilot, Mr. Alexander



MODEL S-55

Passenger, in Savoia-Marchetti Seaplane (bombardment type) S-55 during 1935:

Without payload: 1,000 miles, average, 100.0 M.P.H.
1,000 lbs. payload: 1,000 miles, average, 100.0 M.P.H.
2,000 lbs. payload: 1,000 miles, average, 100.0 M.P.H.
Time of flight: 6 hours, 20 minutes.

4,000 lbs. payload: 1,000 miles, 4 hours, 20 minutes.
Speed for 1,000 miles: 100.0 M.P.H.
Speed for 2,000 miles: 100.0 M.P.H.
Speed for 4,000 miles: 100.0 M.P.H.

With 6,000 lbs. payload: Speed for heaviest cargo carried at 100.0 M.P.H.

Seaplane Savoia-Marchetti (seaplane and bombardment) S-59 with 1100 lbs. payload—altitude, 20,196 ft.

Seaplane Savoia-Marchetti (seaplane and bombardment) S-62 with 1100 lbs. payload—300.5 miles, average, 118.06 M.P.H.; with 2800 lbs. payload—621 miles, average, 120.62 M.P.H.

Transatlantic flight in Seaplane S-53, with Commander DeBarre, in April, 1927.

Commander de Pineda's flight of 60,000 miles all around the world including crossing of the Atlantic in both directions in 1927, in Model S-55 double hull monoplane with two 500 H.P. motors in tandem.



Fairchild Models 71 and 41 have BENDIX wheels and brakes!

Again!—two of Fairchild Aviation Corporation's latest and most perfect contributions to the flying world are introduced with Bendix wheels and brakes as standard equipment. Models 71 and 41 are pictured here. Planes, characterized by their extraordinary diversity of service . . . developed in the hard school of service. And Bendix equipment met every condition and requirement.

There must be reasons for such continued endorsement of Bendix wheels and brakes!

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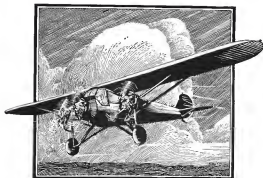
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American Aeronautical Corporation


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THANK YOU for making AVIATION



NORTH . . . EAST . . . SOUTH . . . WEST

from every point of the compass motor alone) with high performance and maneuverability, great carrying capacity, fine visibility, luxurious comfort for six and low maintenance and astonishingly low first cost. Is a profitable ship for the dealer because it is a profitable ship for the purchaser. There is still valuable territory open.

WRITE  NOW!

KREUTZER TRI-MOTOR AIR COACH
SIX PLACE . . . FIVE SEATING . . . CARGO . . . MONOPLANE

JOSEPH KREUTZER
CORPORATION
622 Chamber of Commerce Bldg., - Los Angeles

THANK YOU for mentioning AVIATION

OVER HALF A MILLION MILES

—and
**Still
Flying!**



A Remarkable Record

1924—S-29 was built and was the first large commercial transport plane in the United States.

1925—Crossed two fully loaded planes and set passenger record from New York to Washington, D. C.

First successful radio broadcasting from plane made from this plane. Second passenger passenger from New York to Baltimore, Va. and return.

1926—Made advertising trips over most of the coast of the United States. First amphibious plane to be built accomplished from S-29.

1927—Travelled on first flying trips since 1925.

1928—After the purchase of a German loan by the U.S. in Germany in California.

1929—Still flying for the service.

ABOVE is shown the famous Sikorsky S-29, a *fabulous* all-metal *Sikorsky* amphibian, which was built in 1924. This remarkable plane has flown more than 500,000 miles in the last five years and is still in active service.

The latest product of Sikorsky—the Sikorsky Amphibian S-38, which is pictured below—is of similar, but improved Sikorsky construction.

There could be no more conclusive evidence of the amazing qualities of endurance which are built into the Sikorsky planes.

SIKORSKY AMPHIBION



S-38

Illustrated literature upon request

CURTISS FLYING SERVICE

INCORPORATED

GARDEN CITY, NEW YORK

SOLE SALES AGENTS IN THE UNITED STATES



Manufactured by the SIKORSKY AVIATION CORPORATION, College Point, L. I., N. Y.



400 NEW YORK Ave. New York, N. Y.



Safest, easiest to fly, most dependable
The AVIAN
holds the following records:

First solo flight, England to Australia
 Fastest time, England to Australia
 Longest flight ever made in a light aeroplane
 Longest solo flight ever made
 Fastest time, England to India
 First non-stop flight, London to Rome



National distribution of the Whittelsey AVIAN is planned.

Interested and responsible parties are invited to write for information concerning distributorship in zones throughout the country.

Air Associates, Inc., 535 Fifth Avenue, New York (hangar at Curtiss Field), have been appointed distributors for the New York zone.

WHITTELSEY MANUFACTURING COMPANY

(formerly Whittelsey Body Company)

GENERAL OFFICES AND PLANT, BRIDGEPORT, CONN.

TRADE MARK for Whittelsey AVIAN

ANNOUNCEMENT



The outstanding sport and training plane
of the world

AVRO AVIAN

will be manufactured under royalty
 rights in the United States with the
 trade-mark Whittelsey Avian.



TRADE MARK for Whittelsey AVIAN





Meets Every Demand for a Small Outstanding Cabin Biplane

SPECIFICATIONS

Cabinair & Plane Cabin Biplane

Dimensions	
Span (over wing)	34 ft. 9 in.
Span (over wing)	34 ft. 9 in.
Wing Area (including)	300 sq.
Wing Area	300 sq.
Wing Area	300 sq.
Wing Area	300 sq.
Wing Area	300 sq.

Capacity and Useful Load	
Seats (with and without)	10 (10)
Weight (with and without)	1,000 (1,000)
Weight (with and without)	1,000 (1,000)
Weight (with and without)	1,000 (1,000)

Fuel Capacity Data	
Capacity (in gallons)	45 (45)
Capacity (in gallons)	45 (45)
Capacity (in gallons)	45 (45)

Performance	
Top speed (in mph)	100 (100)
Top speed (in mph)	100 (100)
Top speed (in mph)	100 (100)
Top speed (in mph)	100 (100)

Approved Type Certificate

Issued by Federal Aviation Commission
for the Department of Commerce
on October 10, 1938. Certificate No. 100.
Certificate is valid until 1940.



THANK YOU for choosing AVIATION

In airplane transportation there can be no substitute for experience. The only men who have a hand in the design and construction of Cabinair planes are men who have been doing day-in and day-out flying for the past 30 years. As a result of this, Cabinair meets every demand for a small cabin biplane. Because of its exceptional stability, performance, ruggedness, and ease of control, Cabinair has found a definite place in the small cabin biplane field.

Not only has the rule of experience been applied to the design and construction of Cabinair, but the heads of various departments, engineers, etc., are men who have been chosen because of their close and permanent association with the aviation industry during and since the War.

Standard Cabinairs are powered with a Warner Scarab 110-32P motor, which gives them reliable and dependable performance. Cabinair has ample visibility—far more than most other planes. Cabinair is equipped with fuel struts and Bendix self-energizing wheel-brake system. People who have flown and ridden in Cabinair have remarked about the exceptional comfort, leg room, head room, and ample baggage accommodation. People who have used Cabinair remark about its excellent landing, takeoff, and climb.

Cabinair sells for \$2,398.00, fully equipped. Equipment includes Cabin heater, exhaust ring, windshield wiper, rudder, upholstered water doors, rubber floor, an interior of canvas, metal door trim, standard steel prop, standardized control panel. Due to our simple production facilities, we are now in position to make immediate delivery, in less than 4 to 10 days.

We have a profitable distributor franchise open in several good territories. If interested, write for full detailed facts and figures.

Paramount Aircraft Corporation
SAGINAW Dept. A2 MICHIGAN

FIRST AGAIN !



First to insure on a Flying Hour Basis

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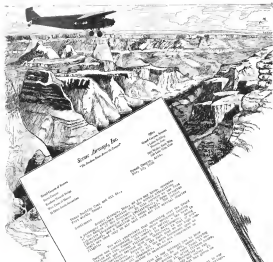
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